WHAT IS CLAIMED IS

1. At least partially purified protein, capable of modulating DNA replication in plants, at least comprising in the amino acid sequence:

a) one or more of the amino acid sequences chosen from the group consisting of those, given by SEQ ID NOS 6, 7, 10 and 12, or

b) one or more amino acid sequences having at least 50% amino acid identity with those of a).

2. Protein according to claim 1, comprising one or more of the amino acid sequences according to b), the respective amino acid identity being at least 90%.

3. Protein according to claim 1, having the amino acid sequence as given in SEQ ID NO 5 or NO 11 or NO 13, or having at least 50% amino acid identity with one of the said sequences.

4. Protein according to claim 1, being a plant CDC27 protein or a functional analogue thereof.

5. Mutein of a protein according to claim 1, comprising at least one amino acid substitution, deletion or addition, affecting the DNA replicative effect of the said protein.

6. Mutein according to claim 5, wherein at least one of the phosphorylatable amino acidS are deleted or substituted by one or more non-phosphorylatable amino acids.

7. Peptide, comprising:

a) one or more of the amino acid sequences chosen from the group consisting of those, given by SEQ ID NOS 6, 7, 10 and 12, or

b) one or more amino acid sequences having at least 50% amino acid identity with those of a).

8. Antibody, specifically recognizing a protein according to claim 1, a mutein according to claim 5 or a peptide according to

claim 7.

9. Antibody according to claim 8, being at least partially purified.

10. Non-genomic DNA sequence coding for a protein according to claim 1, for a mutein according to claim 5, or for a peptide according to claim 7, or a DNA sequence having a sequence homology of at least 75% of the said sequence or the complementary DNA sequence thereof.

11. DNA sequence according to claim 10, being substantially free of sequences intervening the coding sequence.

12. DNA sequence according to claim 10, comprising the DNA sequence as given by SEQ ID NO 9 or SEQ ID NO 14 or SEQ ID NO 15 or having a sequence homology with SEQ ID NO 9 or SEQ ID NO 14 or SEQ ID NO 15 of at least 75% or the complementary sequence thereof.

13. DNA sequence, coding for a peptide according to claim 7, corresponding to nucleotides 109-181 or 2125-2181 or 1029-1061 of SEQ ID NO 9, or to nucleotides 109-181 or 2092-2148 of SEQ ID NO 14 or to nucleotides 1-483 of SEQ ID NO 15, or a DNA sequence, having a sequence homology of at least 75% to the said sequence or the complementary sequence thereof.

14. DNA vector, at least comprising the DNA sequence according to claim 10.

15. DNA vector according to claim 14, further comprising a promoter, functional in plant cells, operably linked to the DNA sequence according to claim 10.

16. DNA vector according to claim 14 or 15 comprising DNA coding for a mutein according to claim 5, operably linked to a nematode-induced promoter, functional in plant cells.

17. Method for positively or negatively effecting plant cell

division, comprising the step of transforming plant cells with DNA according to claim 10 or with a DNA vector according to claim 14.

18. Method for modulating the growth of plant cells, comprising the step of transforming plant cells with DNA according to claim 10 or with a DNA vector according to claim 14.

19. Method for modulating DNA replication in plant cells, plant parts or plants by conferring to one or more plant cells the capacity to provide a protein according to claim 1, or a mutein thereof according to claim 5, in an amount sufficient to modulate DNA replication and/or to block mitosis of the said cells.

20. Method according to any of the claims 17-19, wherein the said capacity is conferred to one or more plant cells, by

a) transforming one or more plant cells with DNA according to claim 11 or with a DNA vector according to claim 14,
b) culturing the plant cells in order to regenerate plant parts or plants from the transformed cells, or
c) incubating the cells, plant parts or plants at conditions allowing expression of the said DNA to produce the said protein or a mutein.

21. Method according to claim 17, for the generation of polypoid plant cells, plant parts or plants.

22. Method for identifying and/or obtaining proteins capable of modulating the DNA replication in plants, comprising a two-hybrid screening assay, using CDC27 polynucleotide sequences as a bait and a cDNA library or of a cell suspension culture as a prey.

23. Method for the production of transgenic plants, plant cells or plant tissue, comprising the introduction of a nucleic acid molecule according to claim 10 or a vector according to claim 14 into the genome of said plant, plant cell or plant tissue.

24. Plant cell, transformed with a vector according to claim 14, or comprising the DNA according to claim 10.

25. Plant, obtainable by the method according to claim 17.

26. Progeny of a plant according to claim 25.

27. Plant material such as roots, flowers, fruit, leaves, pollen, seeds, seedlings or tubers, obtainable from a plant according to claim 25.

28. Plant material such as roots, flowers, fruit, leaves, pollen, seeds, seedlings or tubers, obtainable from a plant according to claim 26.